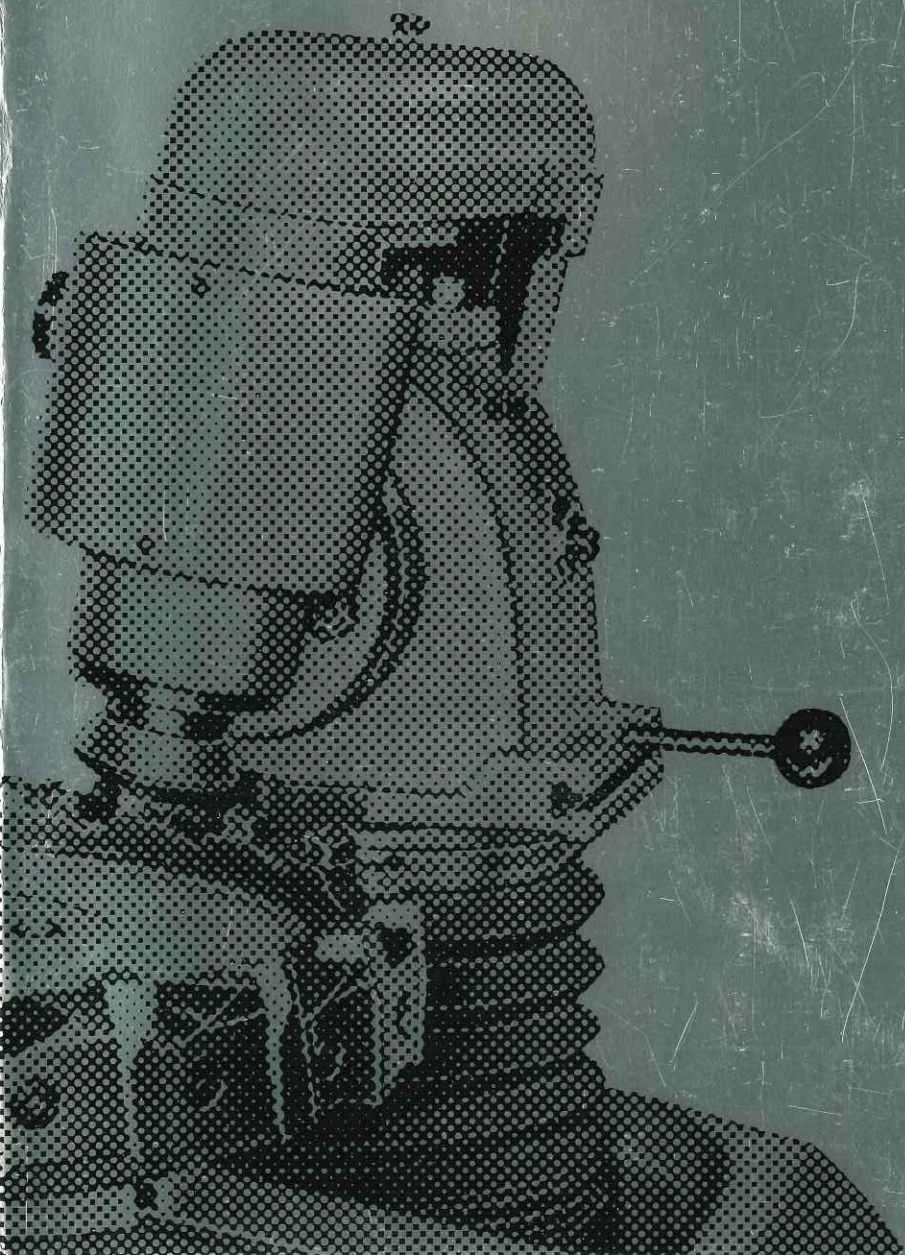


Tool and Cutter Grinding Machine

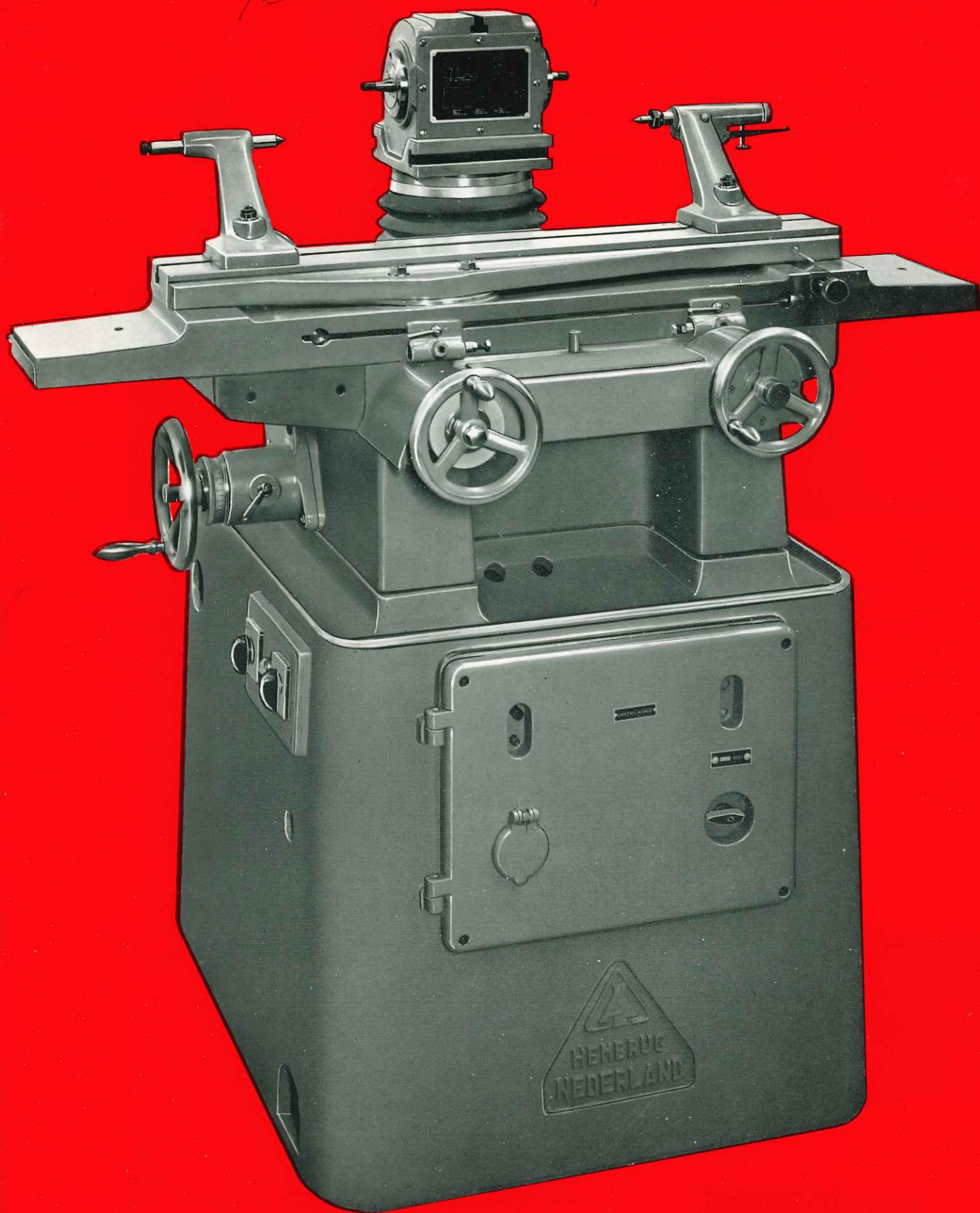
U1

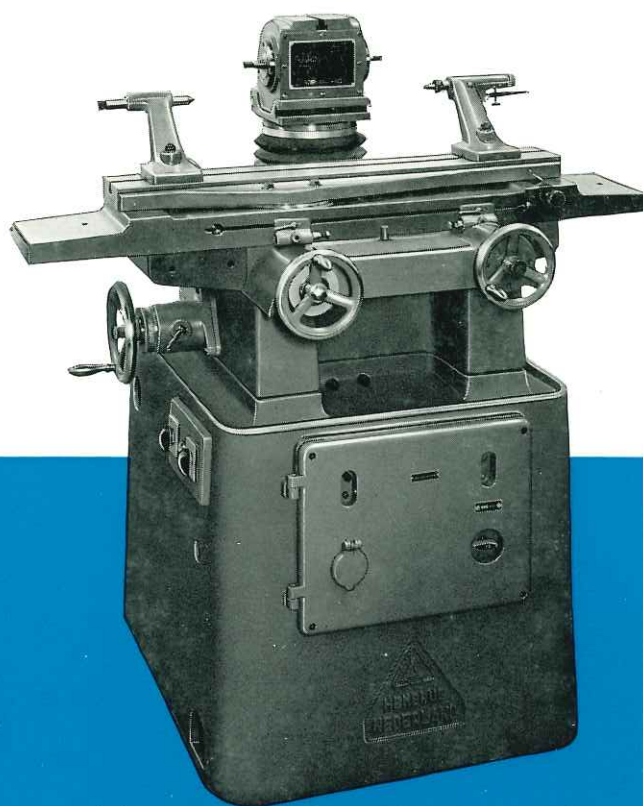
Formgrinder and Tool and Cutter
Grinding Machine

U2



Received 9/14/66





Artillerie-Inrichtingen
Hembrug-Zaandam (Netherlands)

Represented by:



Contents

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Applications U 2	30

Modifications of construction reserved

Tool and Cutter Grinding Machine

Formgrinder and Tool and Cutter Grinding Machine



With the U 1 and U 2 models we meet the daily increasing demand for tool and cutter grinders of extremely high precision.

With them we fulfil the requirements of the modern metal and wood working industries for grinding machines that offer the technical possibilities for accurately producing and maintaining all the tools needed.

The U 1 and U 2 grinders are versatile quality products of international high standard, which combine utmost accuracy * with simplicity in operation.

The very sturdy U 1 is the machine for grinding cutters, tools, taps, reamers, dies, normal and special measuring and manufacturing instruments, as well as for surface and cylindrical grinding, both internal and external.

The U 2 offers moreover amongst others the possibility of internal and external form grinding with the aid of templates.

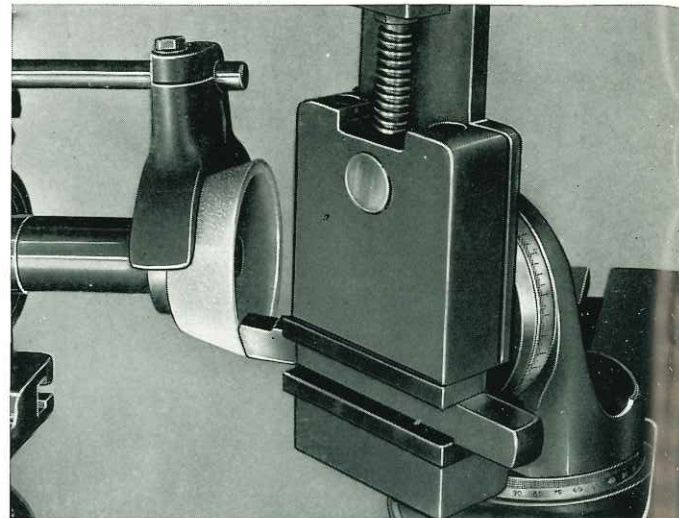
One single movement, however, is sufficient to convert the U 2 into a normal tool and cutter grinder.

We endeavour to give you with this catalogue an as complete survey as possible of the very progressive construction and the many possibilities of application of our grinding machines.

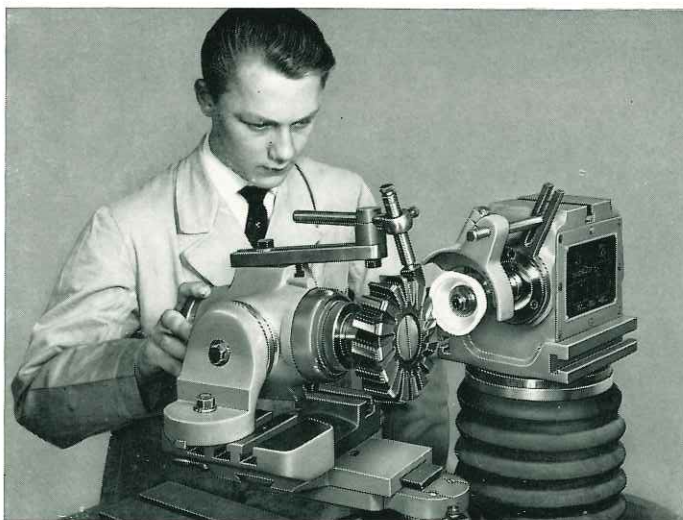
* Our machines come up in all respects to the requirements of accuracy as per Prof. Schlesinger

- 1) Grinding the clearance angle on a cranked roughing tool.
- 2) Radius grinding on a face mill with the radius grinding attachment
- 3) Grinding the clearance angle of a straight reamer (angle adjustment with the aid of clearance setting dial)
- 4) Internal and external grinding of a drilling bush with the aid of cylindrical and internal grinding attachments
- 5) Cylindrical form grinding of a plug gauge on the U 2

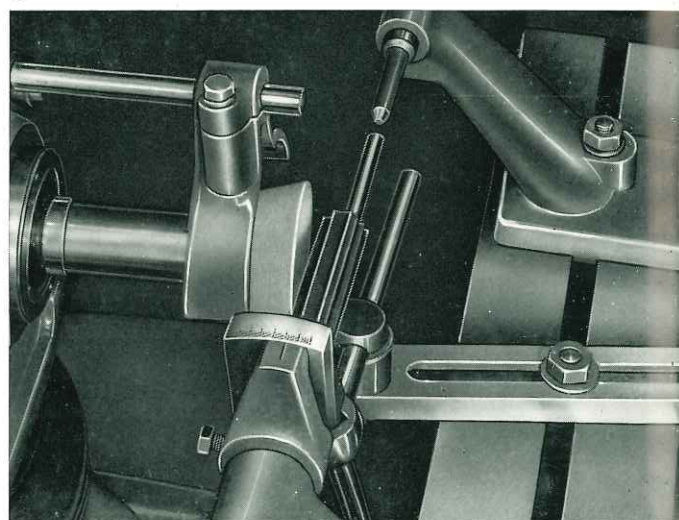
1



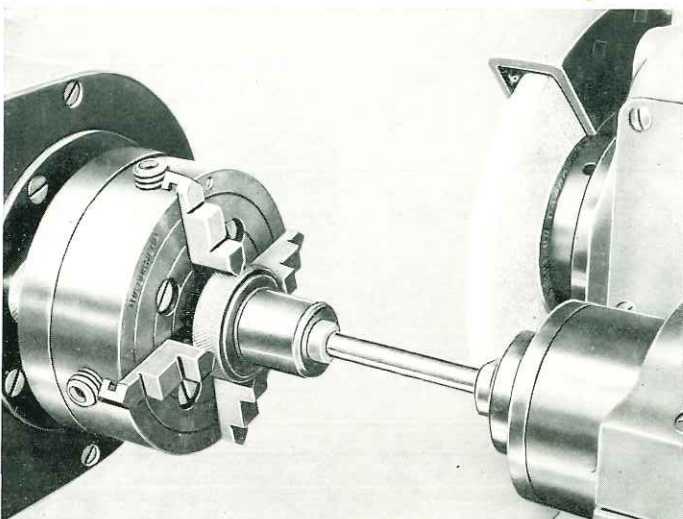
2



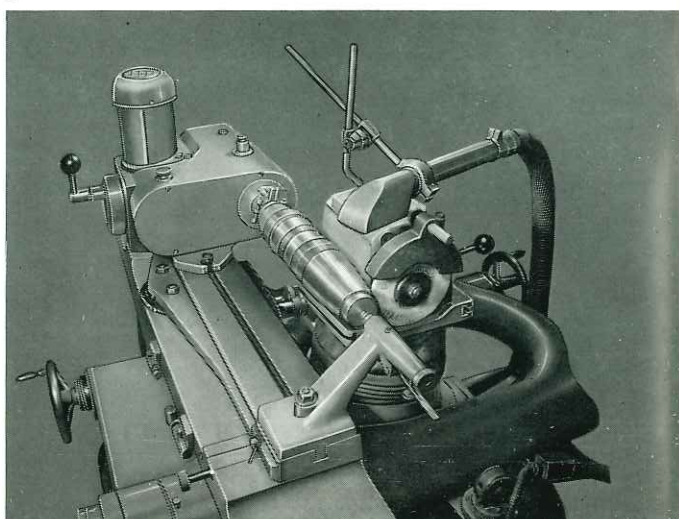
3



4



5



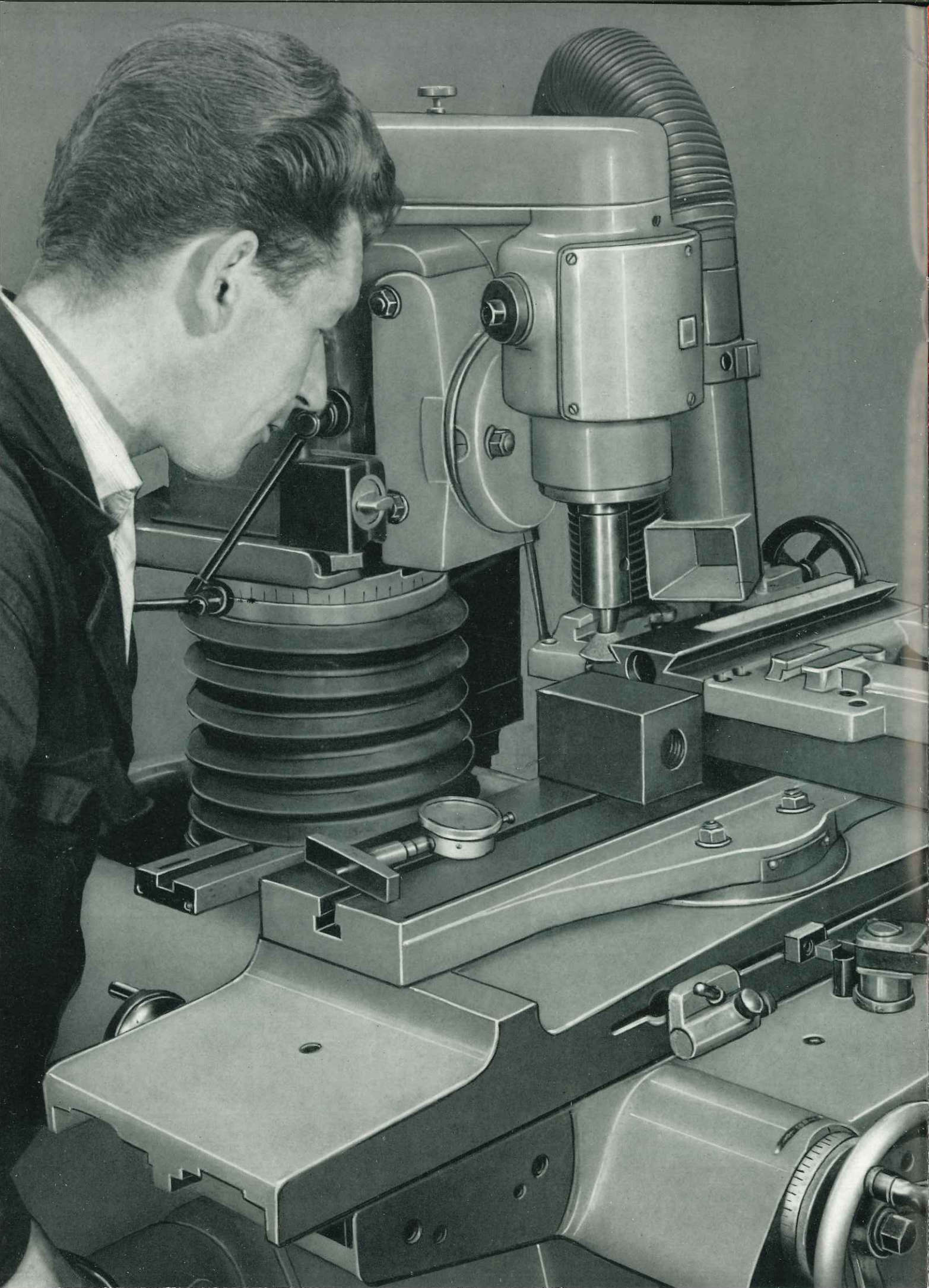
Predominant features



- hardened and ground solid main spindle
- very good surface quality thanks to spindle bearings mounted with light press-fit into the housing
- wheelhead and column cast integral
- spindle speeds 3000 and 6000 r.p.m. without shifting belt
- longitudinal slide runs extremely light and takes heavy weights as a result of line contact of rollers
- high stock removing capacity
- fully closed cross-slide
- flat belt drive
- spindle locking via push button
- reading of cross and vertical displacements .0005" (0.01 mm)
- vertical adjustment derived from wheel head column
- with hydraulic table traverse one man can, in many cases, operate more machines.



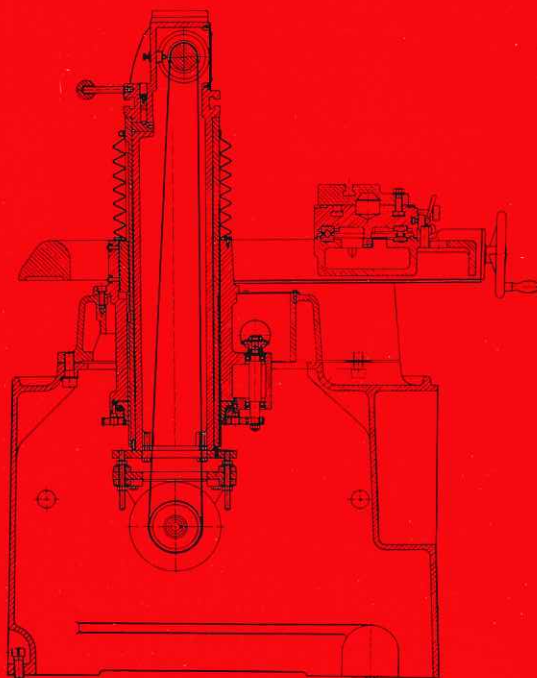
- cross slide running on rollers
- form grinding of surfaces
internal and external cylindrical form grinding
- grinding of cutting and clearance angles of face mills in one set-up
- grinding of taper or profiled pieces with and without helical flutes
- one single movement converts machine into a normal tool and cutter grinder



Technical description

U1

U2



Base and Main Drive Motor

The sturdy cast iron box type base encloses the wheelhead drive and the electrical equipment. A door of ample dimensions gives access to the drive motor which is mounted integral with the bottom of the wheelhead pillar which is vertically displaceable.

The flat belt for the wheelhead is in the pillar and can be mounted **without dismantling the main spindle**.

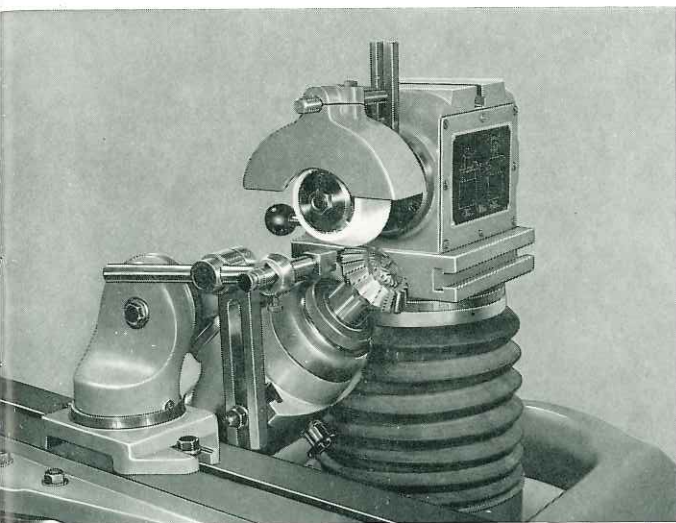
The base carries — on three points — the extremely rigid and heavily ribbed intermediate casting in which are housed the elements for the rise and fall of the wheelhead.

The two speed motor makes it possible to drive the main spindle with 3000 or 6000 r.p.m. without belt shifting.

The electrical control panel incorporates a socket for connecting the cylindrical grinding attachment and a switchgear to give forward and reverse movement of the workhead spindle.

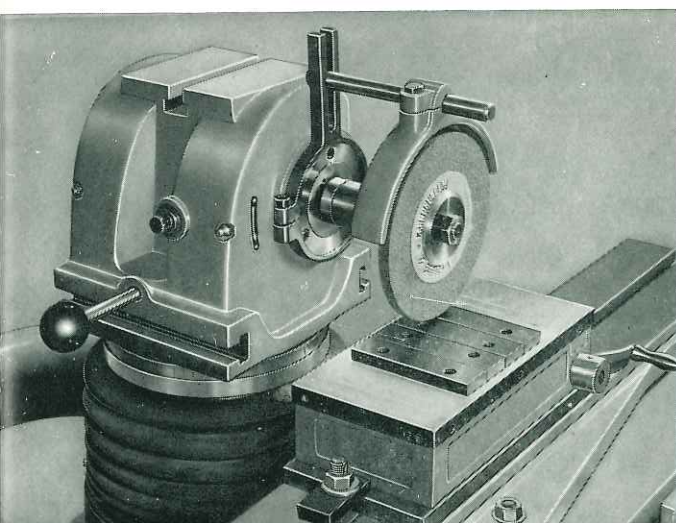
The switchgear for the main spindle speeds is protected by a safety device to ensure that the machine is not accidentally knocked into high speed. Moreover a pilot light indicates when the machine has been set to run at 6000 r.p.m.

All motors are protected by thermal overload releases. The main drive motor has moreover a no-voltage protection.



- 1 Resharpener an angle cutter
- 2 Surface grinding with the aid of a magnetic chuck

Wheelhead with Column and Vertical Adjustment



- 2 Grinding wheelhead A can be swivelled through 355° in the horizontal plane in respect to column B. A graduation permits the angular setting.

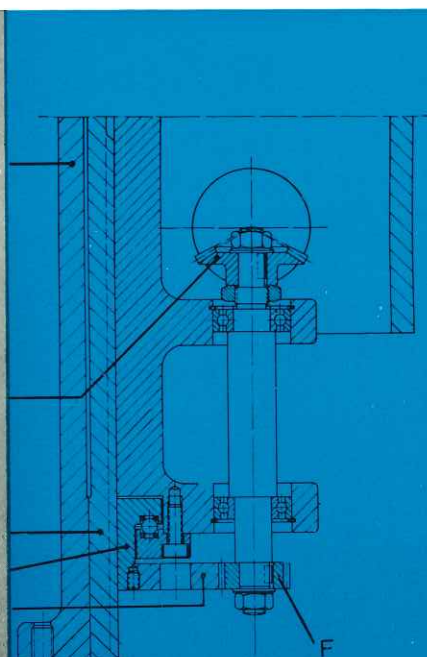
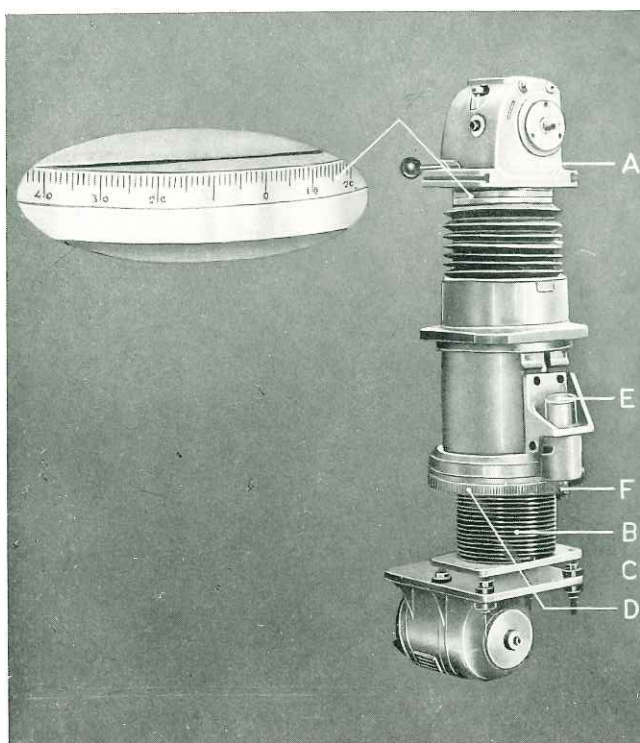
Contrary to many constructions the wheelhead of the U 1 and U 2 is vertically adjustable, whereas the longitudinal and cross slides rest on the intermediate casting.

Vertical adjustment is obtained by means of a thread and nut construction which works as follows:

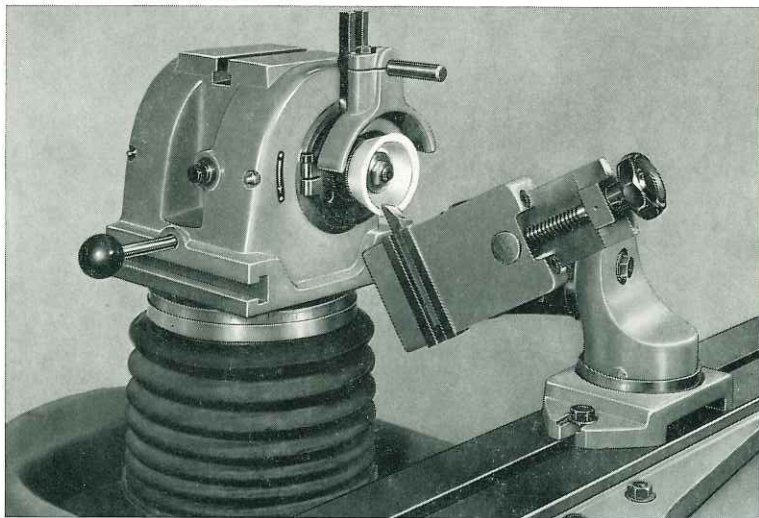
Nut C which is supported in the main housing by a thrust bearing and which is in constant touch with pinion D, rests in the trapezoidal thread of outer column B.

By turning the handwheel for the vertical adjustment this nut is rotated via the bevel gears E and the gears F-D, thus causing the rise or fall of the inner column.

The vertical adjustment has a dial graduated in $.0005''$ or 0.01 mm .

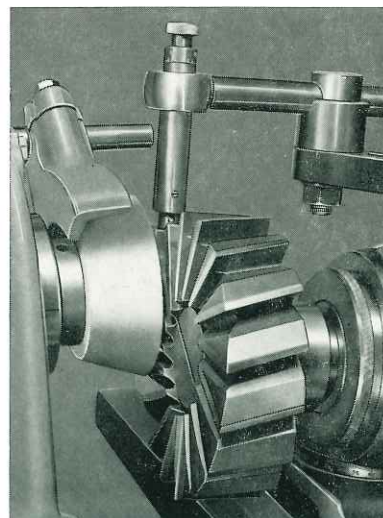


U1
U2



1

1
Grinding the clearance angle of a
thread cutting tool



2

2
Grinding the clearance angle on
the teeth of a shell end mill

Grinding Wheelhead

The grinding wheelhead with spindle is on top of the inner column.

The wheelhead has accurately machined plain bores which ensure a very close fit with the spindle bearings.

A push button in the wheelhead makes it possible to lock the spindle for mounting the wheel collets.

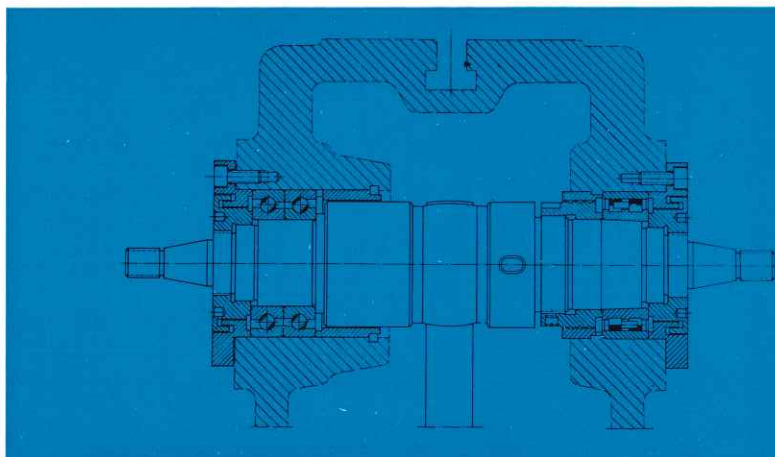
Spindle

The sturdy hardened and ground spindle is manufactured from chrome-nickel steel.

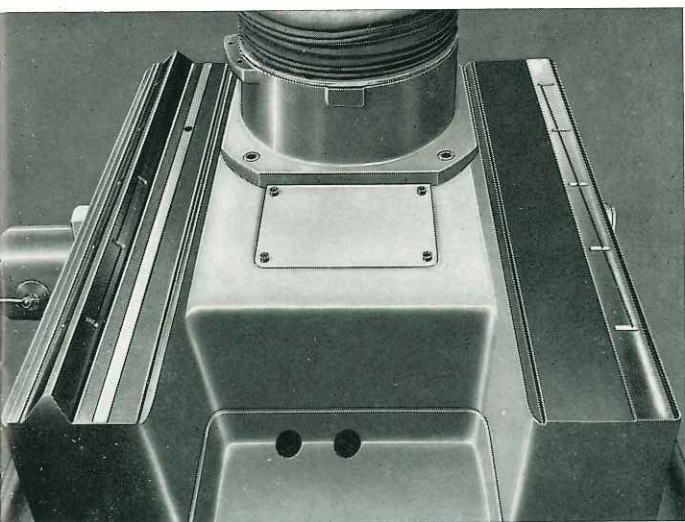
It is supported by a double row cylindrical roller bearing and two angular contact bearings.

These very accurate bearings are mounted with pre-load thus ensuring a high surface quality of the work ground.

The entire vertically adjustable column is protected from abrasive grit by a bellow-type cover.



U1
U2



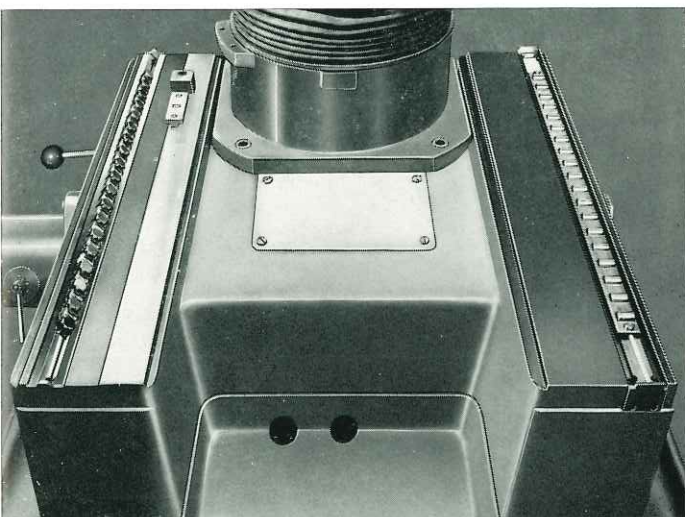
U1

Cross Slide U 1

The intermediate casting on the base of the machine carries the closed cross slide which is arranged with one flat and one Vee guide way of large dimensions.

The cross feed is derived from a screw which has a hand-wheel and a dial at both ends. One division = .0005" or 0.01 mm.

The cross feed screw is supported by 2 taper roller bearings. Its nut is bolted to the intermediate casting.



U2

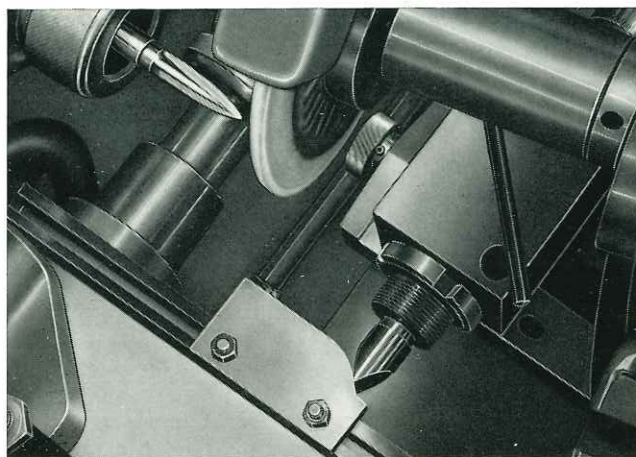
Cross Slide U 2

This cross slide runs on selected rollers on the hardened and ground guide ways of the intermediate casting.

When the cross slide is to traverse independent from its screw for form grinding, the simple shifting of a lever suffices to disengage the nut from the screw. Now the cross slide is pulled backwards by counterweights and the follower pin with fine-adjustment is pushed against the template.

This template is fixed to the ruler which is attached to the table slide.

The longitudinal traverse of the latter allows the cross slide to follow the contour of the template.



Grinding a form tool on the U2 with the aid of a template

U1

U2

Table Slide with Table

The cross slide has hardened and ground steel ways on which the table slide runs extremely light across precision matched rollers.

Rollers offer the advantage that their line contact takes a heavy weight and reduces wear to a minimum.

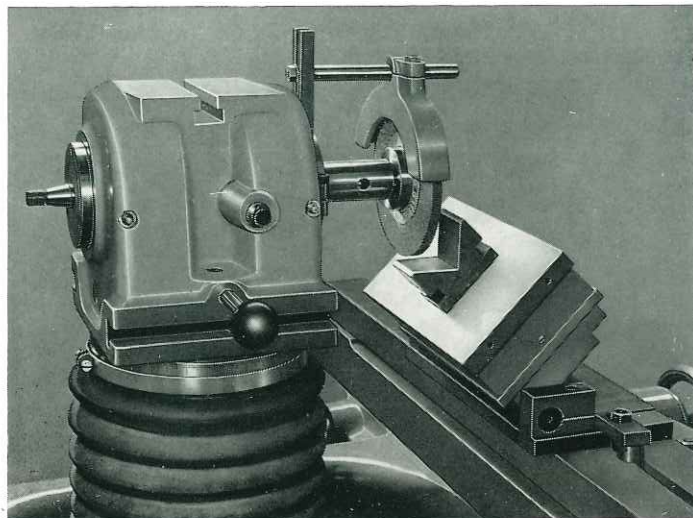
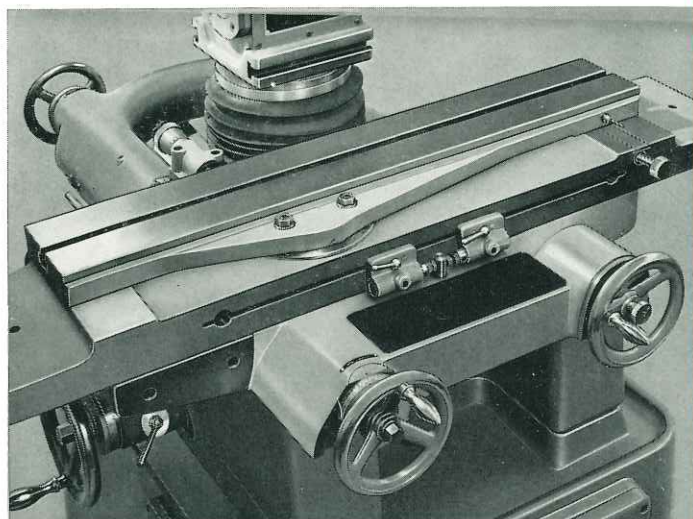
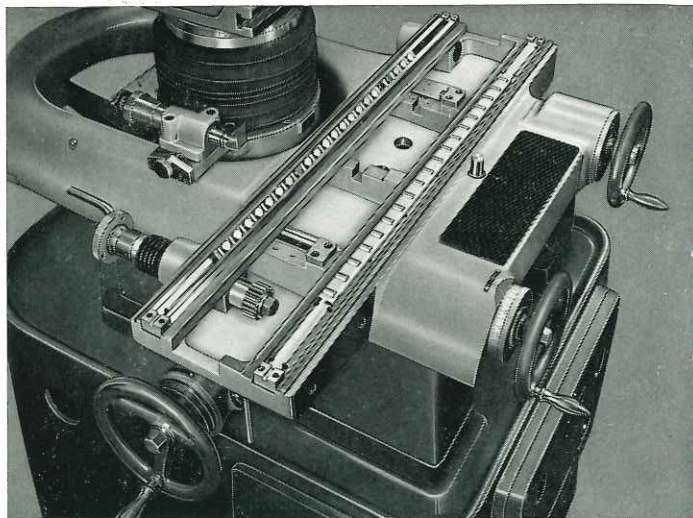
When surface grinding and when grinding various tools the table slide can be traversed rapidly by turning a control knob.

For traversing the table when grinding cylindrically (internal and external) and when truing the grinding wheel, use is to be made of the slow table traversing unit.

To limit the stroke the table slide carries two spring loaded shock absorbing stop dogs which can also be used as positive dead stop after tightening a screw.

The table is arranged to swivel 180° on its slide. Its surface is ground. An accurately machined Tee-slot in the table top permits the perfect alignment and clamping of the various attachments which are for that purpose provided with guide blocks.

The graduation clearly shows the angle setting; a separate fine-adjustment allows for angular adjustment in readings of 10'.



Grinding a Vee block with the aid of a magnetic sine table

Technical details



Maximum distance between plain centres	27.9/16" (700 mm)
Maximum diameter swing on plain centres	11" (280 mm)
Working surface of table	35.5/8" x 5.1/8" (905 x 130 mm)
Width of Tee groove in table	9/16" (14 mm)
Longitudinal traverse of table	16.1/8" (410 mm)
Cross traverse of table	8.5/8" (220 mm)
Table swivels max.	180°
Wheelhead vertical adjustment	10.1/4" (260 mm)
Wheelhead swivels through	355°
Wheel speeds	3000/6000 r.p.m.
Max. distance centre of spindle to table	12.5/8" (320 mm)
Wheel max. diameter	6" (150 mm) ★
1) Max. length to be ground cylindrically between centres	11.7/32" (285 mm)
2) Max. length to be ground internally	4" (100 mm)
3) Max. Morse Taper to be used	No. 5
3) Max. American Taper	2.3/4" (50 Nat)
4) Max. boring for round shafts	3/4" (18 mm)

Dimensions

Height from floor to top	59" (1500 mm)
Necessary space (width)	61" (1555 mm)
Necessary space (depth)	55" (1400 mm)

Motor data

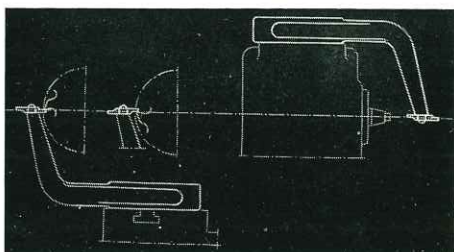
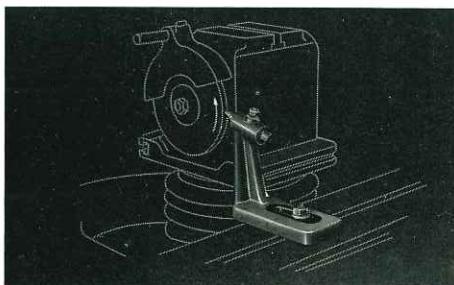
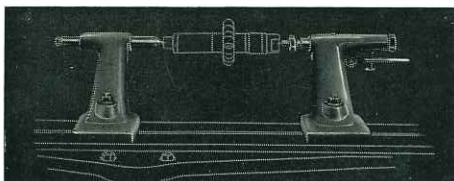
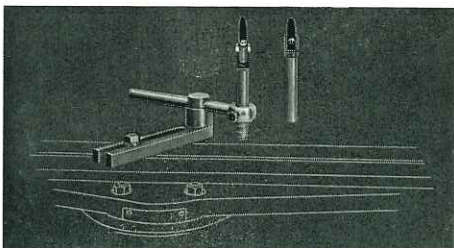
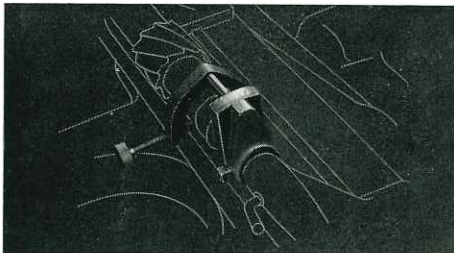
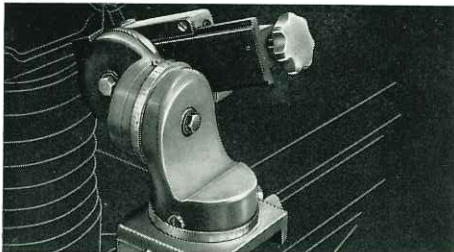
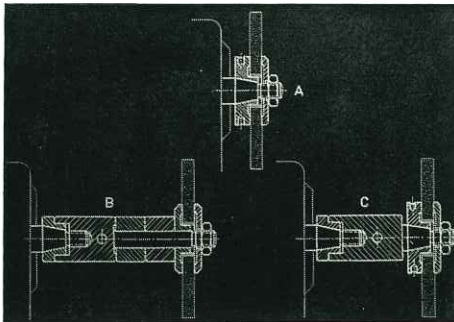
2-speed A/C motor 220, 380, 415 or 440 volt	
At 50 cycles 1500/3000 r.p.m.	
At 60 cycles 1800/3600 r.p.m.	0.8-1.2 hp ★★

Weight

Gross weight of machine inclusive of motor, but without attachments	2200 lbs (950 kg)
-------------------------------------------------------------------------------	--------------------

Notes

- 1) use: Cylindrical Grinding Attachment
- 2) use: Cylindrical and Internal Grinding Attachments
- 3) use: Large Universal Workhead
- 4) use: Several Extra Attachments
- ★ for external cylindrical grinding max. 8" (200 mm)
- ★★ heavier motor on request



Standard equipment

U1
U2

Wheel collet 20 mm * (1)
spindle extension with taper, left (1)
spindle extension with taper, right (1)
spindle extension with rings, left (1)
spindle extension with rings, right (1)

Open wheel guard dia. 4.1/2" (115 mm)
open wheel guard dia. 6.1/4" (155 mm)
closed wheel guard dia. 6.1/4" (155 mm)
open wheel guard dia. 6.1/4" (155 mm)
4 supporting pins for same resp.
4" (100 mm), 6" (150 mm), 8" (200 mm), and 10" (250 mm) long.

Plain machine vice with base plate and knee bases (2)

Clearance setting dial and dog (3)

Universal holder for tooth rest (4)
Plain tooth rest (4)
Adjusting tooth rest (4)

Left-hand footstock (5)
Right-hand footstock (5)

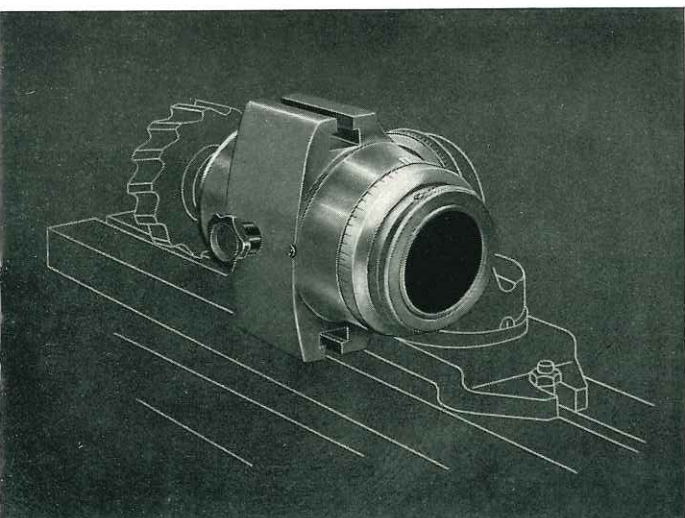
Diamond bracket (6)

Centre gauge (7)

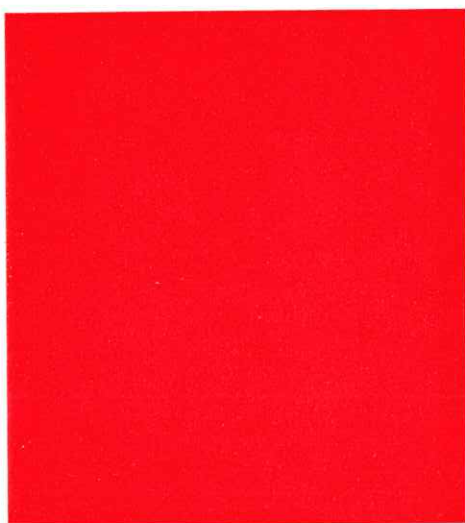
Shock absorbing table stop dog, left
Shock absorbing table stop dog, right

Service keys

* for wheel collets 1.1/4" see page 24



Extra equipment



Large Universal Workhead

The hardened and ground spindle is mounted in two bearings and accommodates cutters with either the No. 5 Morse taper or the No. 50 National Standard taper.

The spindle is knurled at each end to ensure easy rotation by hand. The spindle, which is graduated, can be locked at any required angle.

Tee-slots at two sides of the housing permit the mounting of tooth rests.

Large Universal Workhead with Indexing Attachment

Specially developed for grinding parts or tools which require accurate indexing (e.g. gear cutters).

This workhead has a plate with 24 holes, which can be clamped very accurately to the innerspindle. At extra cost indexing plates with deviating number of holes can be supplied.

For use in these workheads we supply:

Reducing sleeves, hardened and ground:

Morse taper No.	5:4
"	5:3
"	5:2
"	5:1
National taper	50:40

Draw bars National taper 50 and 40

Collet chuck attachment

Collets (see page 24)

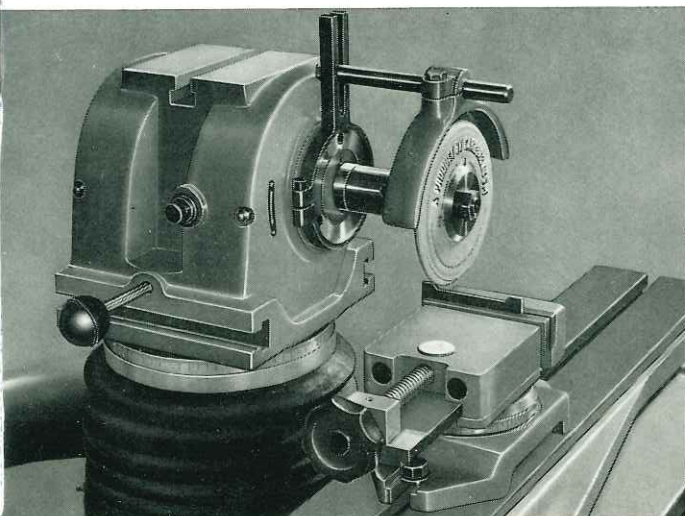
Arbors with No. 5 Morse taper for cutters with arbor holes 3/4", 1", 1.1/4" and 1.1/2" and 16, 22, 27, 32 and 40 mm.

Cylindrical arbors for mounting between centres,

sizes 16 x 160 mm 27 x 250 mm

22 x 200 mm 32 x 315 mm

Grinding a flat gauge with profiled wheel



Extra equipment



Motor Drive for Large Universal Workhead

Should you require only occasionally to grind cylindrically and the purchase of the universal cylindrical grinding attachment with 6 spindle speeds is therefore not justified, this motor drive enables you to compose a plain cylindrical grinding attachment from one of the large universal workheads.

This cylindrical grinding attachment has one spindle speed of 125 r.p.m. The 3 phase A/C motor rates 0.4 hp at 750 r.p.m.

Part of the supply form: connecting cable with plug
2 pulleys
V-belt with guard
knee base

Extra equipment:

collet chuck attachment *

collets (see page 24)

centre No. 4 Morse taper **

cup centre No. 4. Morse taper **

4" dia. 4-jaw independent chuck with No. 4 MT adaptor **

4" dia. 3-jaw self centring chuck with No. 4 MT adaptor **

6.1/4" dia. face plate with No. 4 MT adaptor **

6.1/4" dia. magnet chuck with No. 4 MT adaptor **

guard for grinding wheel 8" (200 mm) dia.

* the drawbar hereof also suits the chucks and face plate

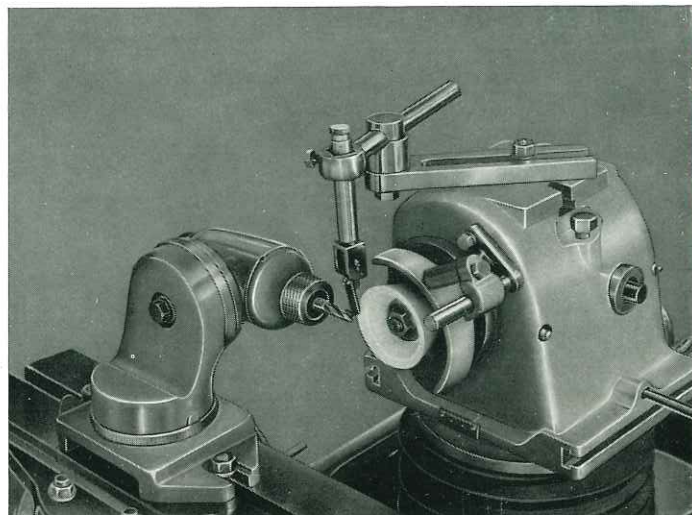
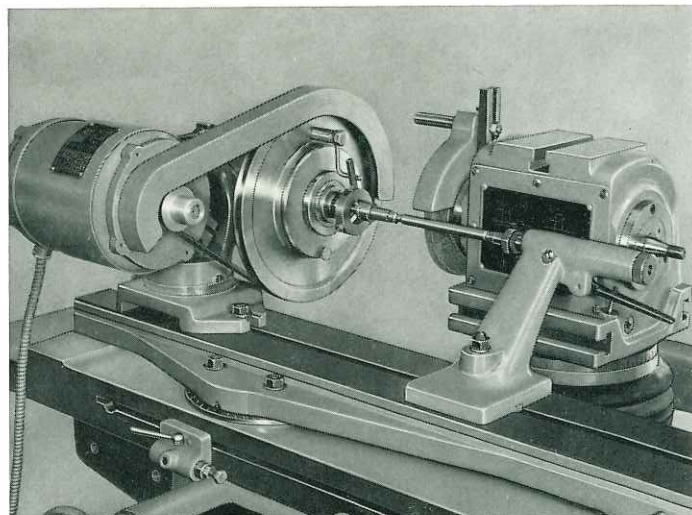
** apply reducing sleeve No. 5 : 4 MT

Small Workhead

To grind small end mills we recommend the use of this workhead which has a convenient grip.

The spindle is supported by two ball bearings and has Morse taper No. 2 at one end. The other side is arranged for collets up to 3/4" bore. The rotating parts are designed to be as light as possible to ensure, that when grinding spiral cutters, the tool easily follows the tooth rest.

To accomodate tools with No. 1 MT shank a reducing sleeve No. 2:1 MT can be supplied.





Extra equipment

U1
U2

Universal Cylindrical Grinding Attachment

This cylindrical grinding attachment is driven by a 0.4 hp 3 phase A/C motor and has a range of 6 spindle speeds of 37,5 to 375 r.p.m. on 50 cycles current, and 45 to 450 on 60 cycles current.

Special attention has been paid to the support of the work spindle. The main bearing is a preloaded double row cylindrical roller bearing, which ensures that the out of round of fly-ground pieces is only a few microns.

The axial support of the workspindle is also very accurate so that surface grinding with the aid of chucks can also be done with high precision.

The spindle speeds are selected in a gearcase by shifting gears but the transmission from gear case to workspindle takes place through built-in double Vee-belt. This ensures a smooth and vibration free drive.

This attachment can be used for live and dead centre work; it is also arranged for both collet and chucking.

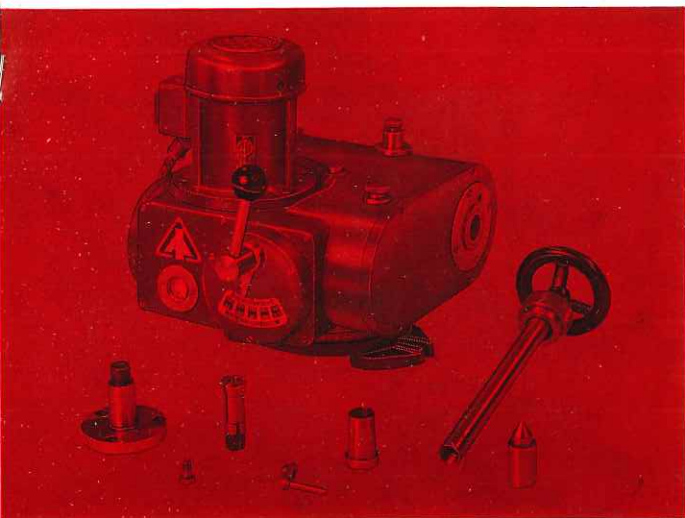
Part of the supply form: connecting cable with plug
base plate
centre No. 4 MT
work driver and wrench

Extra equipment:

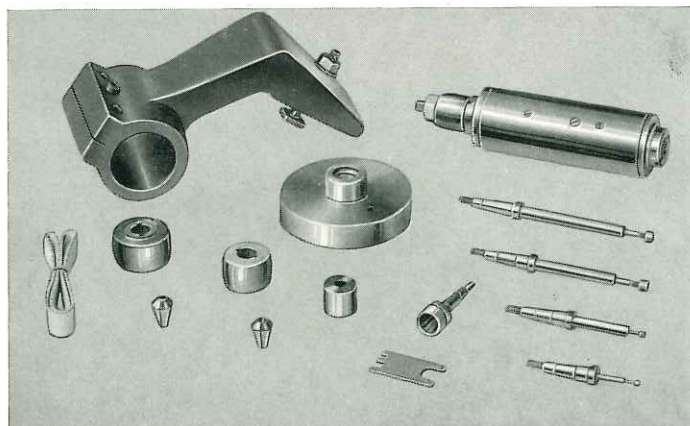
collet chuck attachment *
collets (see page 24)

4" dia 4-jaw independent chuck with No. 4 MT adaptor
4" dia 3-jaw self centring chuck with No. 4 MT adaptor
6.1/4" dia. face plate with No. 4 MT shank
6.1/4" dia. magnet chuck with No. 4 MT adaptor
cup centre No. 4 MT
guard for wheels 8" (200 mm) dia

* the drawbar hereof also suits the chucks and face plate



Extra equipment



Internal Grinding Attachment

To enlarge the possibilities we can supply an internal grinding attachment which is mounted to the machined face on top of the wheelhead.

It is driven by the wheelhead spindle through pulleys and a flat belt.

A set of four pulleys makes it possible to select the following speeds:

7.000 — 8.500 — 10.000 — 14.000 — 17.000 and 20.000 r.p.m.

It is possible to perform internal and external cylindrical grinding jobs in one set-up.

The attachment consists of:

internal grinding spindle

bracket with bolt M 12 x 6 and nut

4 pulleys

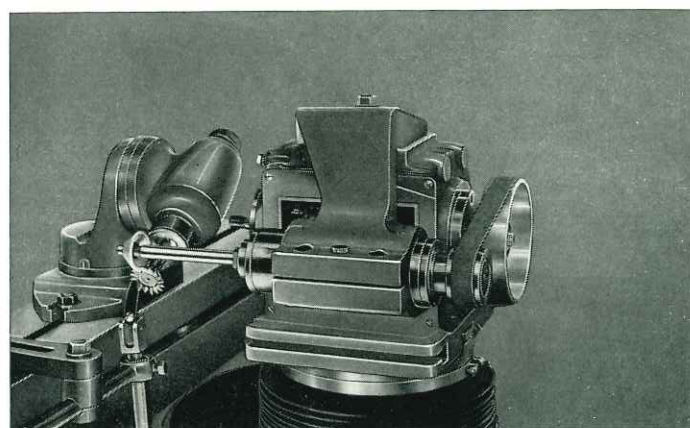
flat endless belt, width 22 mm, length 580 mm

extension spindles 1.1/4" (30 mm) and 2.3/8" (60 mm) for wheels with 1/8" (3 mm) bore

extension spindles 3.1/4" (80 mm) and 4" (100 mm) for wheels with 1/4" (6 mm) bore

Further we supply:

collet chuck with collets 1/8" (3 mm) and 1/4" (6 mm) bore for pin wheels

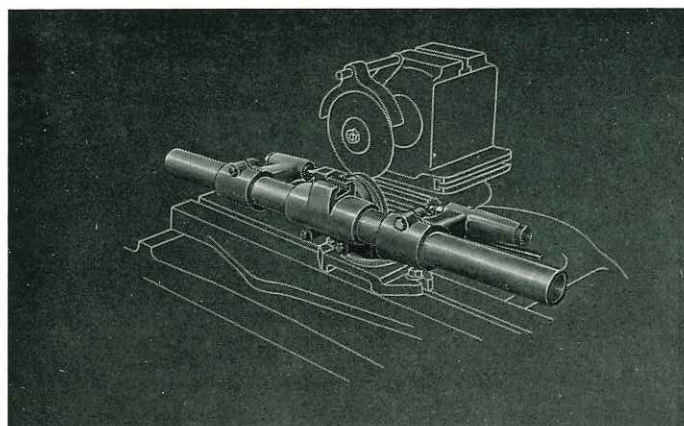


Attachment for Grinding Taper and Long Reamers

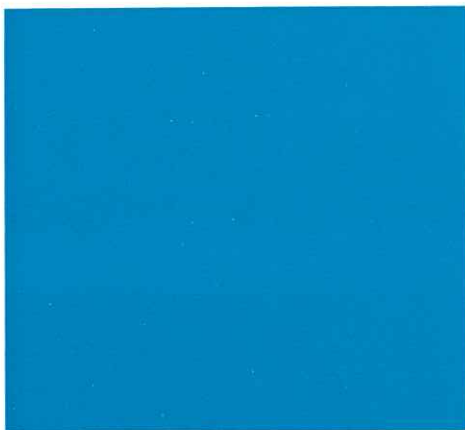
Necessary for grinding the cutting edge and the relief angle of taper reamers with straight flutes.

Max. distance between centres: 24 1/2" (615 mm)

Min. distance between centres: 3 1/2" (90 mm)



Extra equipment



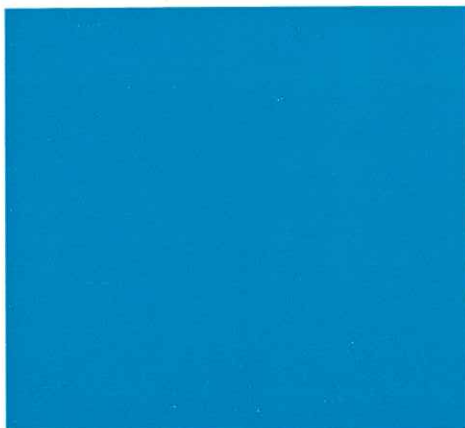
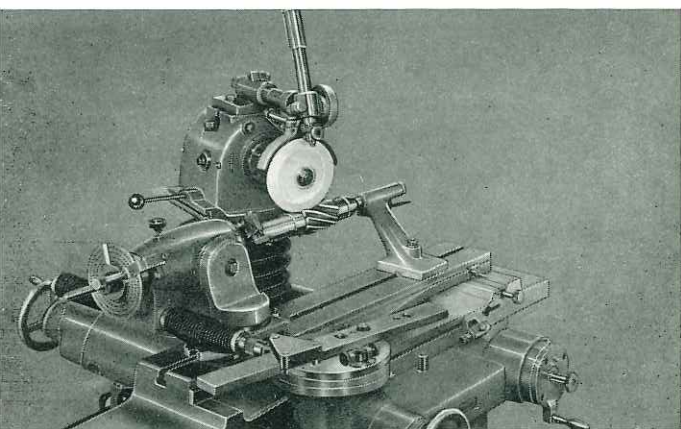
Positive Helical Grinding Attachment

A workhead with inner and outer spindle, specially designed for grinding hobs and other spiral components.

The cutter spindle is driven by rack and pinion from a sine bar mounted on a bracket to the front of the cross slide, and is spring loaded to ensure constant contact between the rollers of the rack and the sine bar.

The sine bar with fine adjustment is set to the helix angle desired. (max. 45°) Reciprocating movement of the table slide causes the spindle to rotate in accordance with the lead set.

The inner spindle, arranged for No. 5 MT is indexed with regard to the outer spindle with the aid of a dividing plate giving 42, 48, 60 and 72 divisions.



Linear Wheel Truing Attachment

This attachment is mounted on top of the wheelhead and is often used in combination with the helical grinding attachment.

It is used to form accurate angles from 0—45° on either side face of the wheel. Graduations allow for accurate but easy setting.

The adjustable diamond holder is operated by hand against light spring pressure.

Max. length to be trued: 2" (50 mm).

Extra equipment

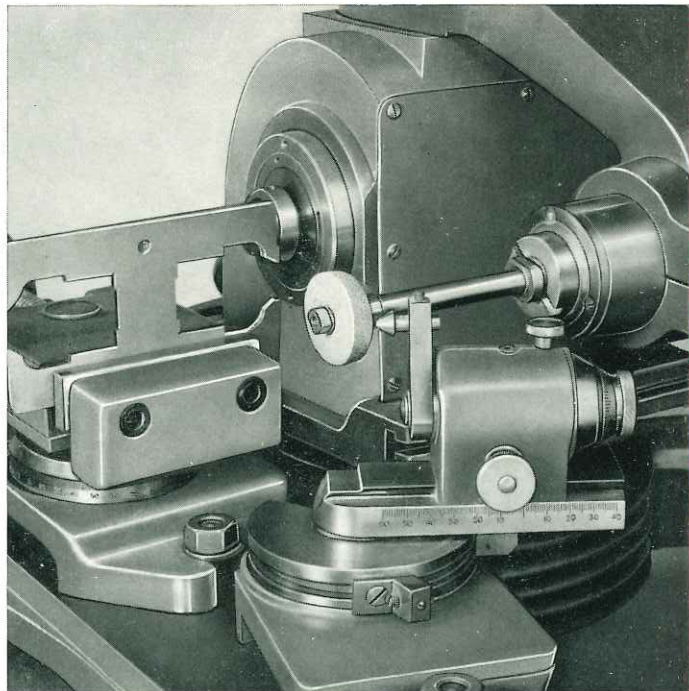


Universal Radius Truing Attachment

This attachment is designed for dressing wheels with concave or convex radii of 0-2.3/16" (0-50 mm) concave and 0-1.5/8" (0-40 mm) convex, by swivelling the diamond on a vertical axis.

Adjustable stops limit the arc of dressing. The zero-point is determined with the aid of a gauge after which the radius is adjusted by means of the longitudinal graduation on the slide. Fine-adjustment (reading .0005" (0.01 mm)) is done with the aid of a dial.

It is also possible to use this attachment for forming angles by reciprocating movements of the diamond holder on a horizontal axis.



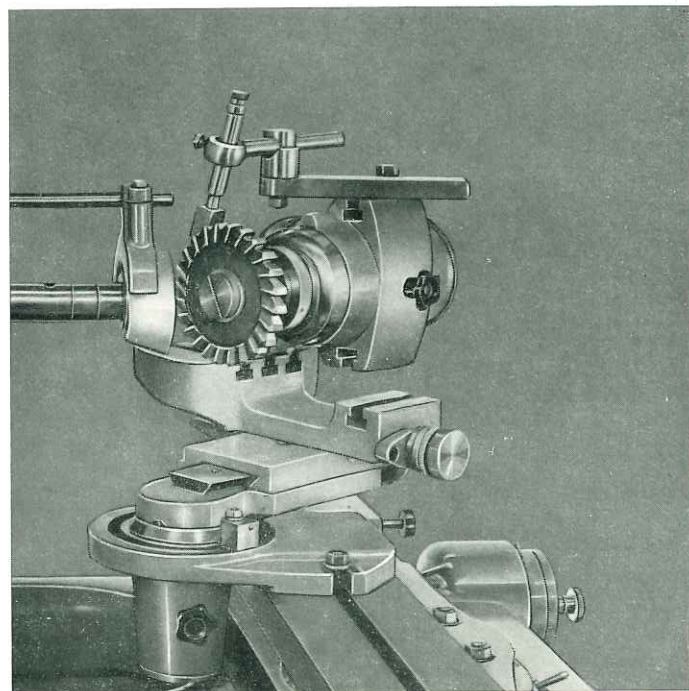
Radius Grinding Attachment

With this attachment convex and concave cutting edges can be ground.

The setting is made by two spindles with graduated dials controlling the top and bottom slides.

The attachment is mounted on a sturdy swivelling base with graduation and stops.

A workhead can be mounted on the top face via one or two knee bases thus making it possible to set the workhead to any desired angle.

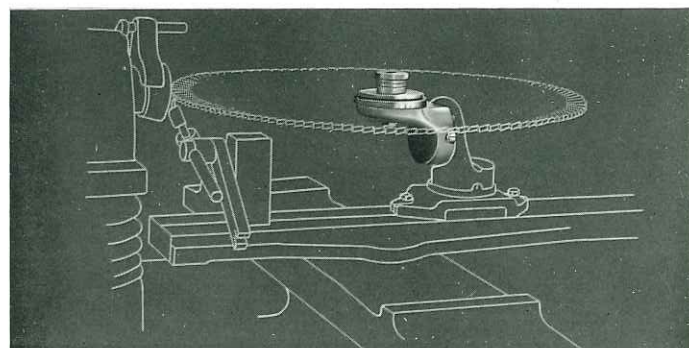


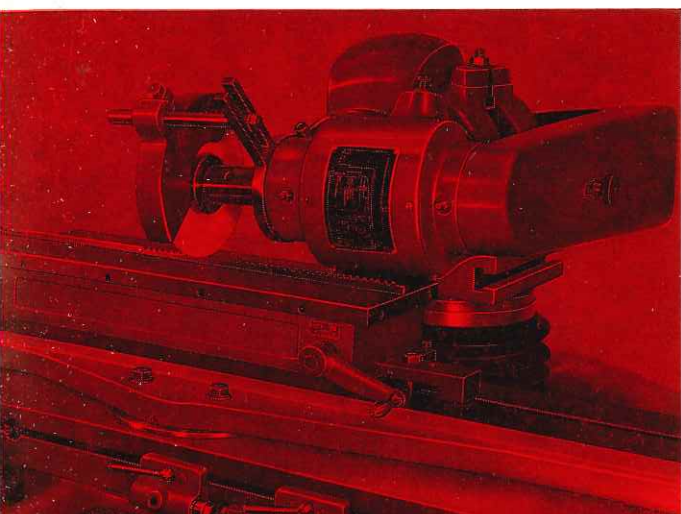
Attachment for Grinding Circular Saws

Grinding circular saws is possible by applying the normal base plate and knee base and this angle plate with centring pin.

The holder with tooth rest is mounted on the table on a height extension.

Max. diameter of saw: 40" (1000 mm)





Grinding a broach

Extra equipment



Vertical Swivelling Grinding Attachment

This attachment, the spindle of which is driven from a pulley on the main spindle, is mounted on the wheelhead of the machine.

It offers special possibilities, also in form grinding.

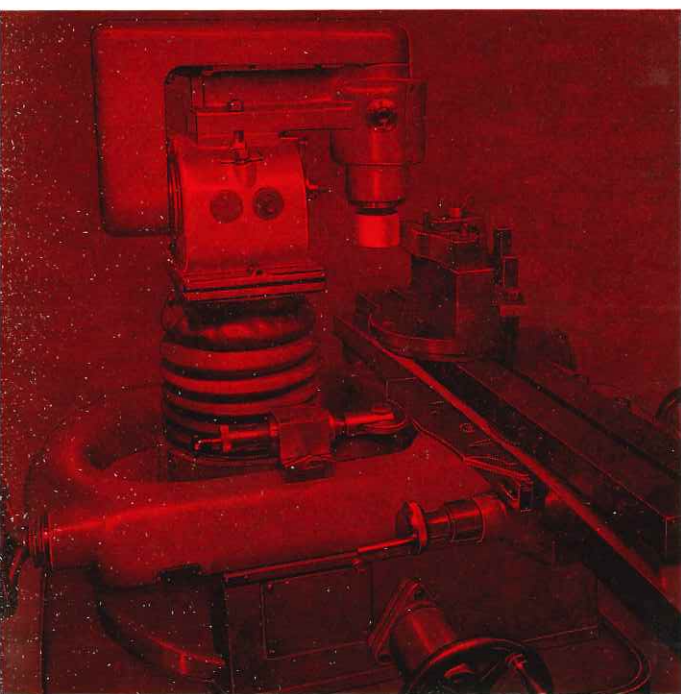
The construction of the spindle is the same as that of the main spindle. In consequence hereof all wheel collets and extension spindles of the standard equipment can be used. A pushbutton permits the blocking of the spindle for easy wheel change.

The vertical swivelling grinding attachment can also be made use of for grinding big bores internally and for grinding taper or form milling cutters with spiral flutes.

Spindle speeds: 2.800 and 5.600 r.p.m.

Composition: housing with wheel spindle and belt guard

- 2 mounting bolts
- 1 belt tightener
- 2 pulleys
- 1 endless flat belt



Duplicate Controls

On desire the machines can be supplied with duplicate controls for vertical wheelhead adjustment and table traverse.

The construction of the extra handwheel for vertical adjustment is such that the sense of rotation of both handwheels is opposite.

Consequently the operator turns on both operating positions in the logical sense.

Extra equipment



Hydraulic Table Traverse

Specially recommendable for surface and cylindrical grinding of products in series.

Table speed steplessly variable between 1 and 33 ft/min. (0,3 and 10 m/min.)

A control permits stopping the table traverse at the end of the stroke.

Loosening a knob at the right of the table slide uncouples this slide from the piston thus enabling the operation of the table traverse by hand.

Automatic Indexing Attachment for Grinding Face Mills

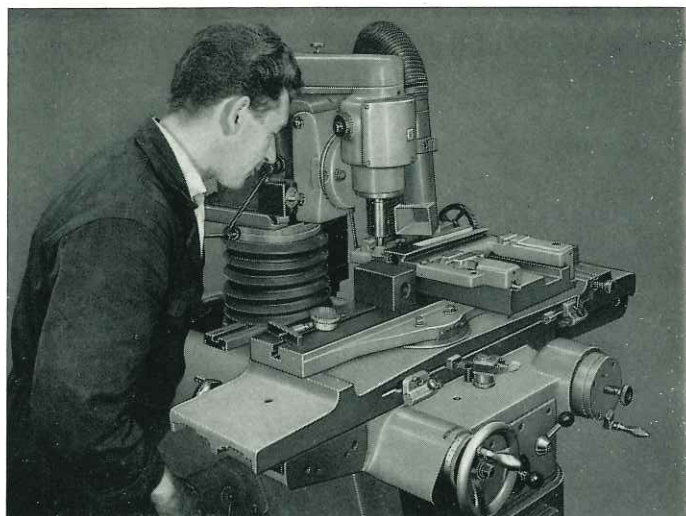
The use of this attachment is very advantageous for workshops where face mills up to approx. 18" (450 mm) dia. have to be ground regularly. It offers the possibility that the operator does other jobs simultaneously.

Indexing is done automatically; it is only necessary to feed inwards at regular intervals.

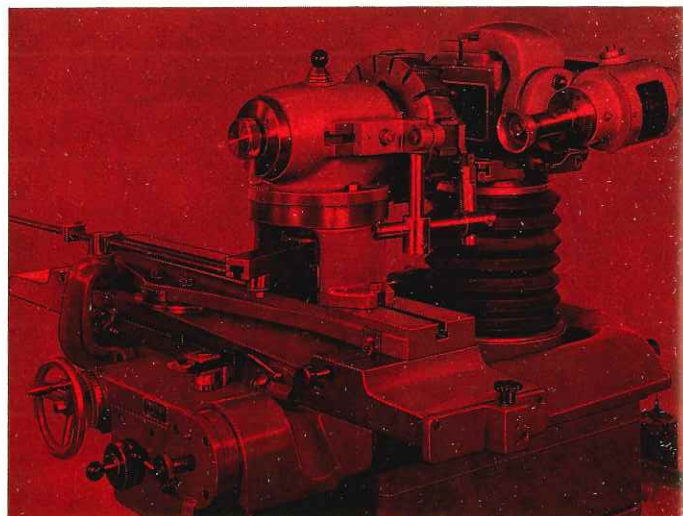
The attachment is used on both the U1 and U2 models with hydraulic table traverse, in combination with the vertical swivelling wheelhead.

The workhead with face mill or e.g. a saw swivels in the horizontal plane thus enabling the grinding of the periphery of all blades in any angle desired.

It is also possible to grind the faces of the blades. The sense of rotation of the spindle may be reversed so that LH and RH mills can be ground. The axis of the spindle is 10" (250 mm) over the table. The milling cutters to be ground, positioned in the workhead by means of an arbor with No. 6 MT, must have at least 4 teeth.

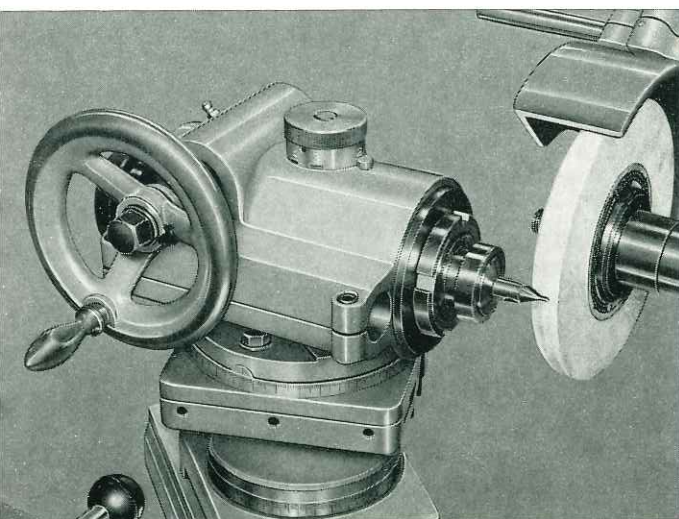


Grinding lathe slides on a U1 with hydraulic table traverse





Extra equipment



Tap Relief Grinding Attachment

This attachment is indispensable to grind the correct relief to taps. The spindle has No. 4 MT on both ends and therefore accommodates both LH and RH taps.

The extent of the oscillatory motion, adjustable from 0-5/64" (0-2 mm) can be derived from a graphic forming part of the supply.

Since the spindle housing can swivel on its slide the attachment can also be used for relief grinding centre drills. When used on the U2 which offers the possibility of applying any profile to the grinding wheel, the attachment will also permit to grind the relief on profiled drills.

The construction is such that without changing cams the relief on the lands of taps having 2, 3, 4 and 5 flutes can be ground.

Dependent on their length, diameter and the presence of centres, it is possible to take taps and centre drills:

- a) between centres : max. length 8" (200 mm)
max. dia. 3.1/8" (80 mm)
- b) in collets : max. dia. of shaft 3/4" (18 mm)
- c) in a self centring chuck: max. dia. of shaft 1" (25,4 mm)

Standard equipment: centre No. 4 MT

counter centre

work driver

Extra equipment:

reducing sleeve No. 4 MT to collet taper

collets (see page 24)

4" dia. 3-jaw self centring chuck with No. 4 MT adaptor
drawbar for collets and chuck.

Special Extension for Large Face Mills

The top face of this base is inclined to an angle of 15°. The graduation on the base permits the adjustment of the workhead in the desired angle.

Dust Exhaust Unit

Highly recommendable for the health of the operator and to preserve new machine accuracy.

Collets

For use in the workheads, cylindrical grinding attachment, positive helical grinding attachment and tap relief grinding attachment.

The complete series comprises 35 collets from 1 to 18 mm bore incl., in increments of $\frac{1}{2}$ mm, respectively 23 collets from $\frac{1}{16}$ " to $\frac{3}{4}$ " bore incl., in increments of $\frac{1}{32}$ ".

Reduced Cup Centre No. 1 MT
Long reduced Centre No. 1 MT

Dependent on the work to be ground these centres can replace the normal centres in the footstocks

Collet Assemblies

The construction is such that grinding wheel and collet, once assembled and balanced, remain one unit.

Though originally developed for diamond wheels these wheel collets are used more and more for normal vitrified grinding wheels.

Available are collets for wheel bores $\frac{3}{4}$ " and $1\frac{1}{4}$ " or 20 and 32 mm.

When ordering specify LH or RH.

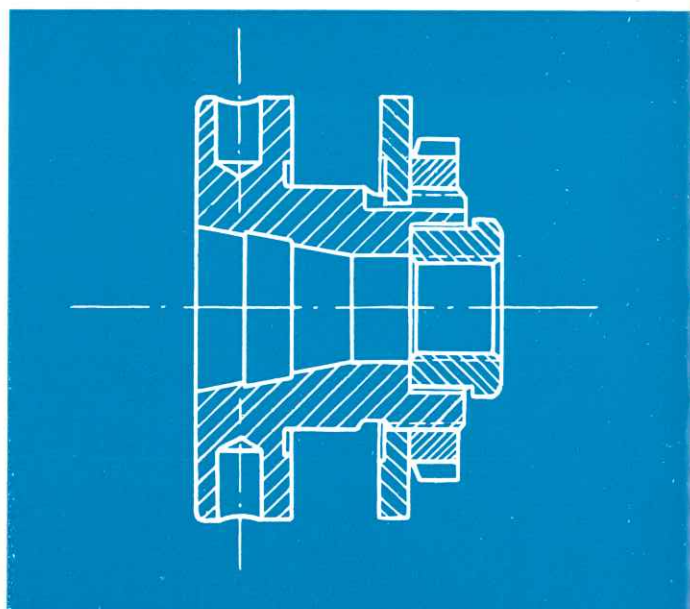
Fine Adjustment to Stop Dogs

Graduation : 1 division = .0005" (0.01 mm)

Applicable to both the standard stop dogs for table slide and the cross slide stop dogs mentioned on page 27.

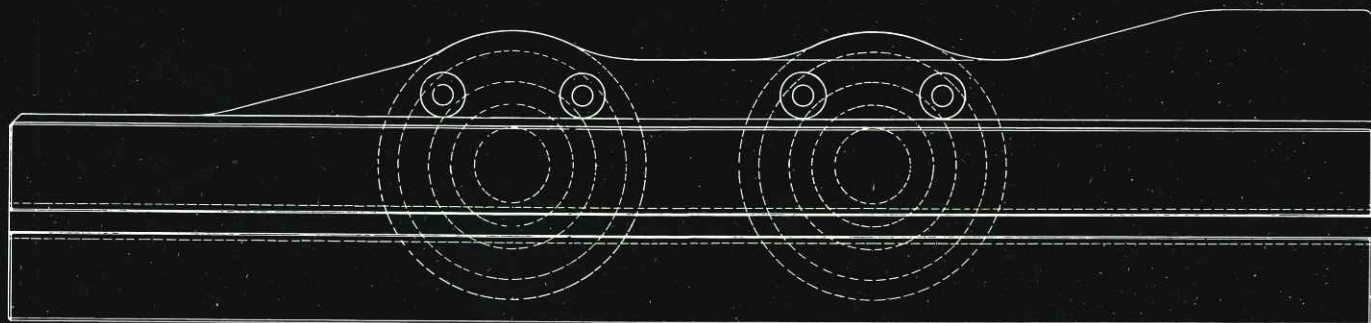
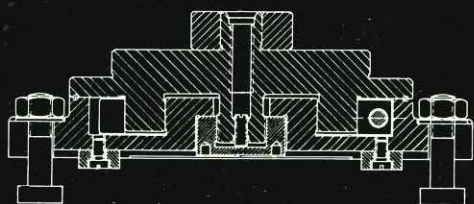
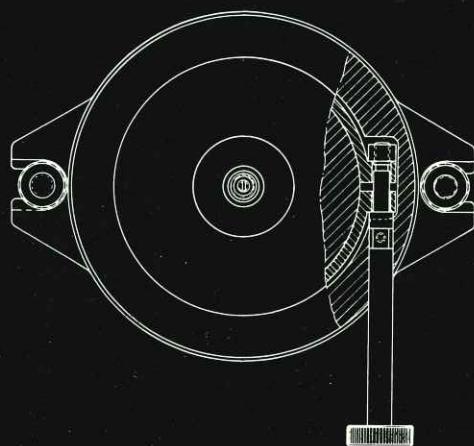
Extra equipment

U1
U2



$$\frac{U_1}{U_2}$$

U2





Extra Equipment U2 specially developed for Grinding Face Mills in horizontal Position*

◀ Turntable for Face Mills

Turntable for Face Mills

This turntable consists of a body with centring collar and centring pin. This pin has normally a diameter of 22 mm. On desire deviating pins can be supplied at extra cost. The turntable is provided with a locking device which holds the mill after the blade to be ground has been positioned against the tooth rest.

Cross Slide Stop Dogs

This item comprises a ruler with two stop dogs mounted to the intermediate casting and a detention pin, to be bolted to the cross slide. If necessary these stop dogs can be equipped with the fine-adjustment screws described on page 24.

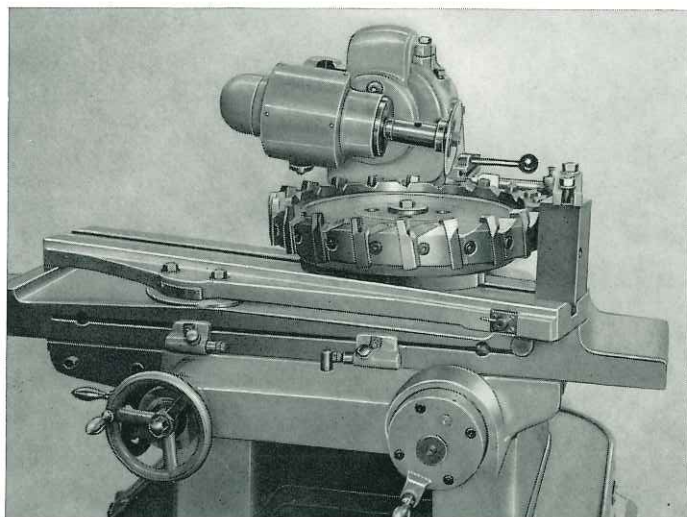
◀ Work Table for accomodating
i. a. Large Face Mills

Work Table for accomodating i. a. Large Face Mills

Replaces the normal work table and enlarges the distance: centre of table to column to such an extent that face mills up to 26" (650 mm) dia. can be accomodated.

* see description on pages 28 and 29.

Grinding Face Mills



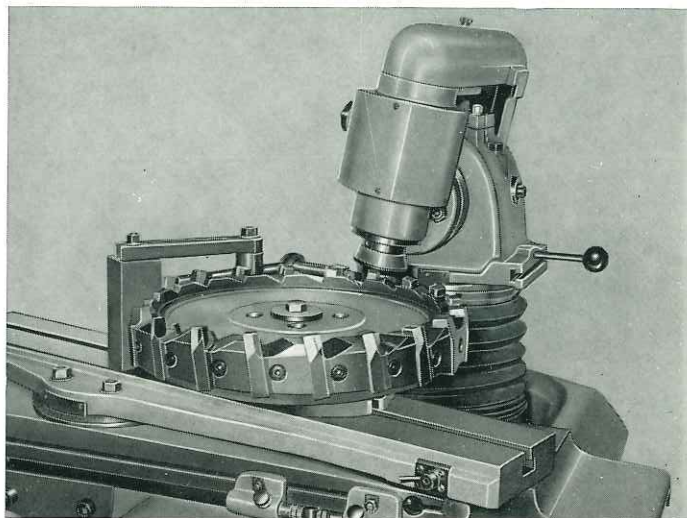
Grinding the face of teeth on a 18" (450 mm) diameter face mill

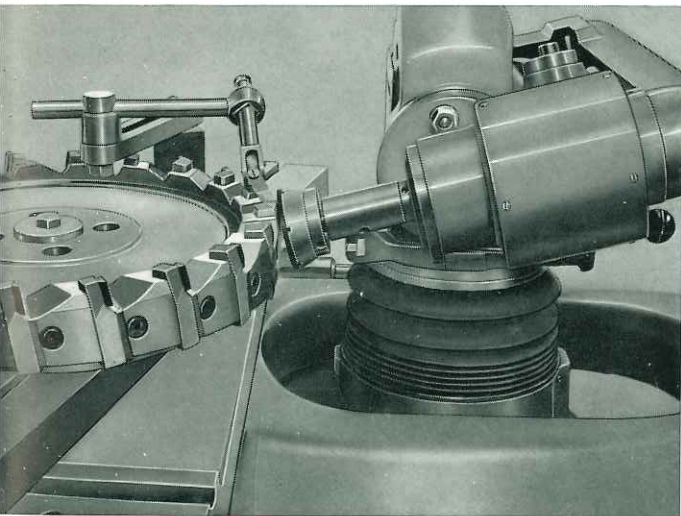
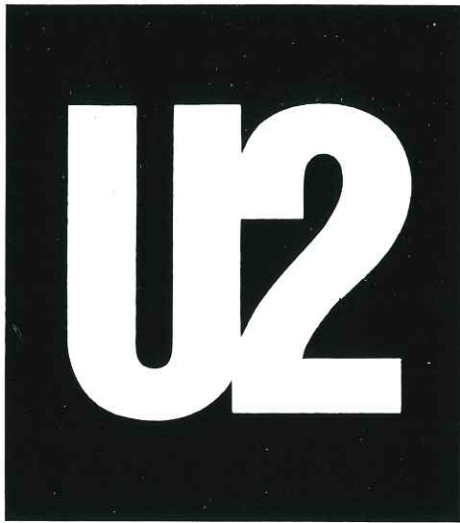
Grinding face mills exceeding 8" (200 mm) dia. on the U 2 Form Grinding Machine offers several advantages:

1. The cutter is clamped with the aid of a turntable*; its centre of gravity then lies within the scope of the guide ways, owing to which a stable set-up is obtained.
2. The face mill is caught upon the centring collar, in other words, it is clamped in the same way as on the milling machine; consequently, it runs perfectly true.
3. Application of the vertical swivelling grinding attachment makes it feasible to grind **all faces at one single set-up.**

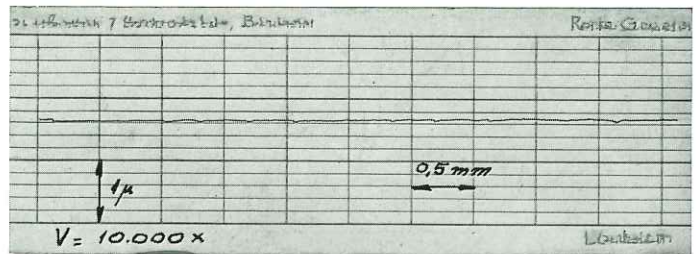
Since during all further operations the faces of the teeth serve as a detention face for the guide finger, they should be ground first. For this purpose the back of the tooth to be sharpened is supported by the adjusting tooth rest. After the diamond wheel has been properly adjusted, the right stop (engaged as a fixed stop) is placed against the detention pin of the cross slide and then locked.

Grinding the secondary clearance angle on a 18" (450 mm) diameter face mill





Sharpening the periphery of teeth on a 18" (450 mm) diameter face mill



A stop with .0005" (0.01 mm) graduation* enables the operator to regulate the feed most accurately, which greatly saves the diamond wheel. Moreover, its use leads to the realization of a very high surface quality.

The cross stroke is limited by the spring-loaded stops of the cross-slide.*

The roughness figure, which, in this grinding process, can be reached with a diamond wheel dia. 3" (75 mm) (bakelite bond, grain D 30, DIN 848 \pm 20-40 microns, concentration IV) amounted to C.L.A. = .4 micro-inch (0.010 micron). The minimum roughness figure attained was C.L.A. = .2 micro-inch (0.005 micron).

The most noteworthy advantages of this method are:

1. substantially lower initial cost
2. if one tooth shows a crumbled chipping face, it is not necessary to equally grind away all other teeth. This fact not only lengthens the life of the cutter but also permits the operator to considerably economize on the use of diamond wheels.

* extra equipment

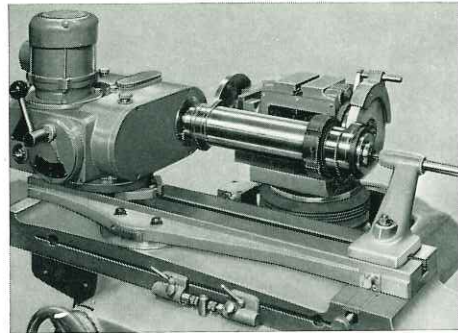
Several unique Applications of the U 2

Formgrinding a Cam Disc

The piece is driven by the universal cylindrical grinding attachment.

The master cam as well as the piece are placed on the same arbor.

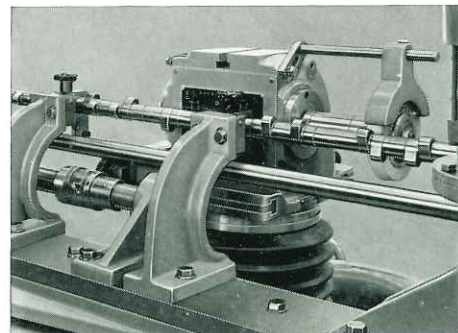
It is essential to set up the special follower roller in the centre of the grinding wheel to avoid deviations in profile.



Formgrinding a Cam Shaft

The cam shaft is driven by a special cylindrical grinding attachment with intermediate drive.

The special follower roller is mounted to the wheelhead.



Grinding Taper or Form Milling Cutters with Helical Flutes

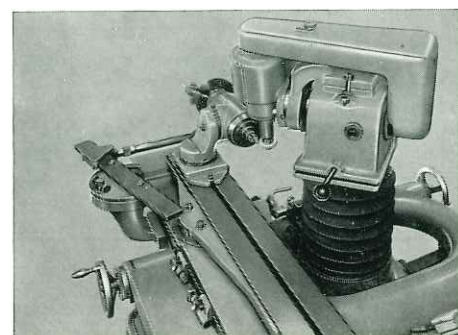
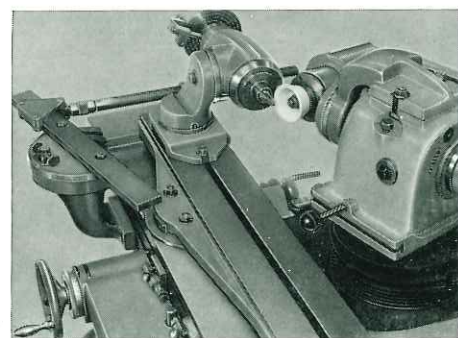
For grinding this type of milling cutters with the aid of the positive helical grinding attachment the U 2 offers new possibilities. These cutters require rotating, cross and longitudinal movements.

The rotating movement is derived from the positive helical grinding attachment, the longitudinal and cross movements from the table and the cross slide.

The table slide carries the template which is in contact with an adjustable follower roller.

To grind the cutting edges use is made of a dished wheel with a bevel of approx. 10°.

This wheel is attached to the vertical swivelling grinding attachment via extension spindle.





- DR 0** CAPSTAN and/or SECOND OPERATION LATHE
spindle bore 1" (26 mm)
- DR 1** AUTOMATIC TURRET LATHE
spindle bore 1.1/4" (32 mm)
- DR 1** SLIDING, SURFACING AND SCREWCUTTING LATHES
Height of centres 5.1/4" (133 mm)
Distance between centres 18.1/2" resp. 30"
(470 resp. 750 mm)
- DR 1 P** SLIDING AND SURFACING LATHES
Height of centres 5.1/4" (133 mm)
Distance between centres 18.1/2" resp. 30"
(470 resp. 750 mm)
- DR 200** SLIDING, SURFACING AND SCREWCUTTING LATHES
Height of centres 8" (200 mm)
Distance between centres 39.3/8" resp. 63"
(1000 resp. 1600 mm)
also in twin-spindle design.

SHAPING MACHINES
stroke 8" (200 mm)

DRILLING MACHINES
up to 1/2" (13 mm) in steel

TAPPING MACHINES
up to M 10 (3/8 WW) in steel

GANG DRILLING MACHINES
2-8 spindles on common base

MILLING MACHINES
with hand levers, screw feeds or automatic cycle

UNIT MACHINES
MACHINE VICES

SURFACE PLATES and MEASURING DEVICES
LENGTH COMPARATORS

In concert with customers these machines can be equipped
with automatic cycle.

We recommend ourselves to solve your form grinding
problems.

**LATHES
SHAPING MACHINES
DRILLING MACHINES
UNIT MACHINES**



